

AIRCRAFT CIRCULARS
NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 24

ROHRBACH ALL METAL COMMERCIAL AIRPLANE RC VIII "ROLAND"

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ROHRBACH ALL-METAL COMMERCIAL AIRPLANE RO VIII "ROLAND."*

It is a semicantilever monoplane with dihedral and one cable from each half of the wing to the bottom of the fuselage. The wing is rectangular with tips rounded. The fuselage has a rectangular section with well-rounded upper edges. This airplane can fly five hours with two pilots and ten passengers.

The axle of each wheel is hinged to the lower fuselage longeron and is held in position by a horizontal strut hinged to the same longeron farther forward. It is also connected with the wing by a vertical spring strut. The vertical struts are provided with spiral springs which act as shock absorbers. The wheels have wire spokes, steel rims and rubber tires 1250 × 250 mm (49.2 × 9.8 in.).

The passenger cabin has a length of 5 m (16 ft. 5 in.), inside width of 1.55 m (5 ft. 1 in.) and inside height of 1.8 m (5 ft. 11 in.) (standing height); seats for ten passengers; plywood floor; leather upholstering to the window sills and cloth above; seats in two rows with aisle between; ten windows 600 × 530 mm (23.6 × 20.9 in.); cranks to open and shut the windows; racks for hand baggage and handles for holding on to; openings in the ceiling for ventilation; device for utilizing the heat from the exhaust gases to warm the air; electric lights; emer-

Translation from the German.

gency exits through cloth-covered openings in the ceiling; toilet room behind the cabin.

The pilots' cockpit is in the front end of the fuselage and is accessible from above. It contains two adjustable seats abreast, provided with arms and straps. The dual control consists of steering wheels and rudder bars. The visibility is good in all directions, even backward and above and below the wings.

The baggage room in the rear part of the fuselage is accessible from without through a door 1.4 x 1.1 m (4 ft. 7.1 in. x 3 ft. 7.3 in.) and also from the passenger cabin. A spare engine can be carried in the front part of the passenger cabin.

The power plant consists of three 230 HP. BMW IV engines. The middle engine is in the front end of the fuselage and the two lateral engines are supported by steel girders suspended from the wings. All the engines are easily accessible.

Starting is by means of three very large compressed air cylinders placed below the pilot's compartment. In order not to use the compressed air unnecessarily, the air cylinders available on the airdrome can be plugged into the starting lines on the airplane by means of a fuselage connection.

The radiators of the side engines are located laterally under the wings; that of the middle engine, under the fuselage. Fuel delivery from the tanks to the wings is effected by pumps. The fuel is protected against fire by fire cocks. The oil sup-

ply is 50% over normal needs; an oil cooler is used. Engine control is accomplished through rods. The short-circuiting of each magneto is possible separately or all together. Wood propellers of the usual type or metal propeller, if preferred, can be employed.

The pilot and assistant pilot sit side by side behind the central engine. The throttle and altitude controls are arranged to be manipulated either together or separately. Nivex gasoline gauges enable the pilot to tell the amount of fuel in each tank.

No fuel piping is carried within the fuselage, all being external. The various pipe lines for water, oil, gas and air are painted characteristic colors in accordance with modern German practice. The lines which run out to the wing engines are set against the front lattice spars and are immediately accessible by swinging up the hinged nose of the wings. As the trailing edge can also be swung open, the inner wing structure can be readily examined.

The aileron control rods are placed just behind the front spars. The rods controlling the elevators and rudders run inside the fuselage and have joints at intervals.

The fittings which connect the wing spars to the body have in addition to the two usual attachments a third placed between them at an angle, a feature which Dr. Rohrbach has patented.

Although there is a door between the cabin and the pilot's cockpit, the latter is customarily reached by a walkway on top

of the fuselage from the tail. The cabin comfortably accommodates the ten passengers. The entrance door is to the rear on the right side and opposite to it is a lavatory.

The stabilizer is adjustable only on the ground and the vertical fin is not adjustable.

The Göttingen 449 airfoil section is used.

Rohrbach system of construction, which means:

a) Material.-- Duralumin in sheets and open sections affording easy inspection of all parts. All rivet heads can be inspected from both sides.

b) Parts easily removed and replaced, thus facilitating inspection and repairs.

c) Metal covering on fuselage and wings, thus providing a supporting surface or walkway on wings.

d) Great strength with small weight.

e) Wings built in longitudinal sections: middle hollow section and hinged leading- and trailing-edge sections for inspection of interior of wing. All the sections provided with fuel tanks, thereby rendering it possible to increase the flight duration.

f) All the tail planes built like the wings (hollow, with leading-edge sections.

Electric equipment.-- The source of power is a generator with windmill drive; and storage batteries (12 volt) with connections for illumination of cabin and instrument board, landing

lights and position lights.

Radio equipment.- We recommend one airplane radio sending set of about 70 watt antenna power for distances of

- 1) Telephone 150-200 km (93-124 mi.).
- 2) Sound signals 180-240 " (112-149 ").
- 3) Undamped 500-600 " (311-373 ").

Antenna about 70 meters (229.66 feet) long, other lengths if desired.

Fire extinguishers- are rigidly installed with distribution pipes to the carburetors, and shut-off device within reach of pilot.

Instruments are in plain sight on instrument board and consist of 3 revolution counters, 3 cooling-water thermometers, 3 oil thermometers, 3 oil manometers, 2 fuel gauges, 1 altimeter, 1 air-speed meter (with Pitot tube), 2 chronometers, 1 compass.

The special instruments used when desired, are:

- 1 gyroscopic inclinometer,
- 1 distance compass with galvanometer and course indicator,
- 1 special altimeter for night flying, scale up to 500 m (1640 ft.),
- 1 searchlight, 1 cabin altimeter,
- 1 map pocket or roller.

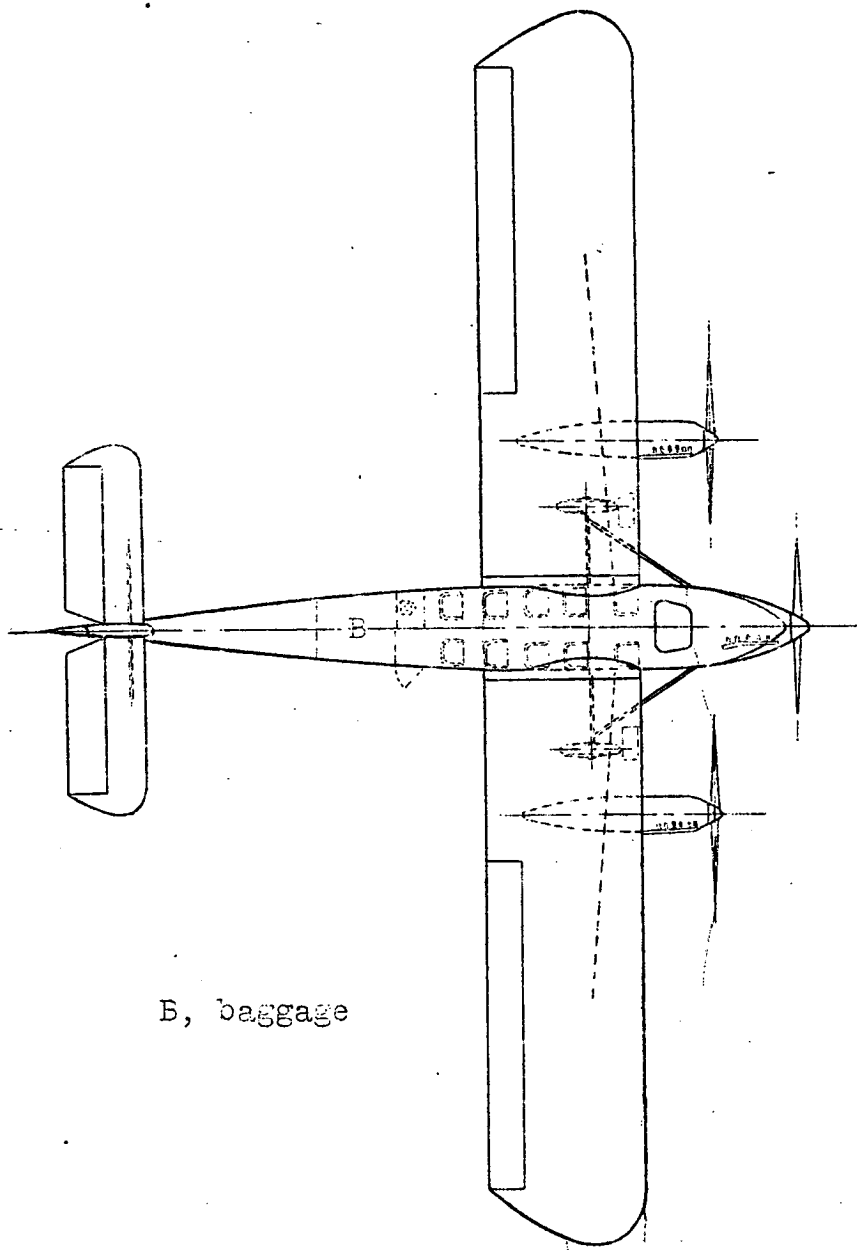
The tool pocket contains: 6 spanners, 1 hammer, 1 monkey wrench, 1 oil can for gasoline, 1 screw driver, 1 spark-plug wrench, 1 combination pliers, 1 oiler.

Characteristics

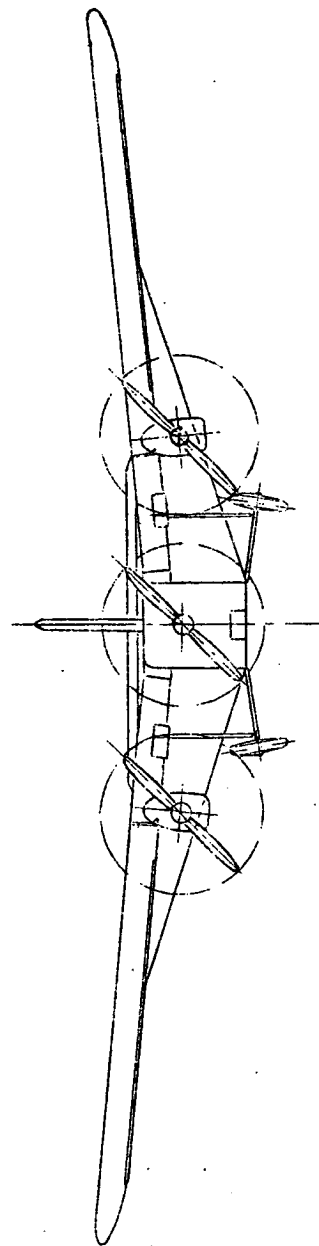
	<u>2/3</u>	<u>Full</u>
Span	36.0 m	(85.3 ft.)
Height (with propeller revolving)	4.5 "	(14.8 ")
Length	16.3 "	(53.5 ")
Wing area	88.0 m ²	(948.0 sq.ft.)
Aspect ratio	1 : 7.7	
Wing loading	69.3 kg/m ²	(14.19 lb./sq.ft.)
Power "	8.8 kg/HP.	(19.4 lb./HP.)
<u>Total engine power</u> , 3 x 230 = 690 HP.		
<u>Fuel</u> ,	1120.0 liters	(296 gallons)
<u>Crew</u> , 2 men =	160.0 kg	(353 lb.)
Weight empty (including water and oil in engines and radiators and cabin furnishings)		
	4100.0 kg	(9039 lb.)
Useful load,	2000.0 "	(4409. ")
Full "	6100.0 "	(13448 ")

Performances

Engine power	<u>two-thirds</u>	<u>full</u>
Speed near ground,	150 km/hr. (93 mi./hr.)	195 km/hr. (121 mi./hr.)
Speed at 2000 m (6562 ft.),	205 km/hr.	(127 mi./hr.)
Landing speed,	100 km/hr.	(62 mi./hr.)
Climbing time to 1000 m (3281 ft.)		7 minutes
Ceiling,	5500 m (18045 ft.)	
Radius of action,	925 km (575 mi.).	



B, baggage



Three
230 HP.
B.M.W.
IV engines

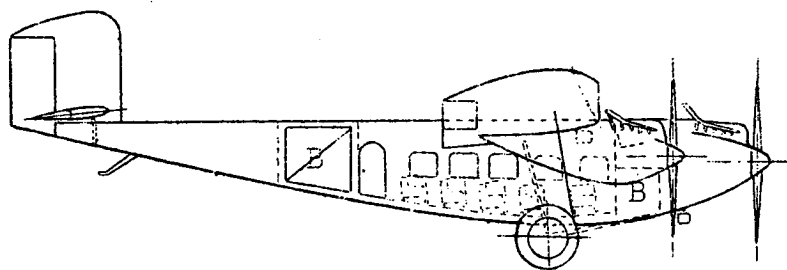
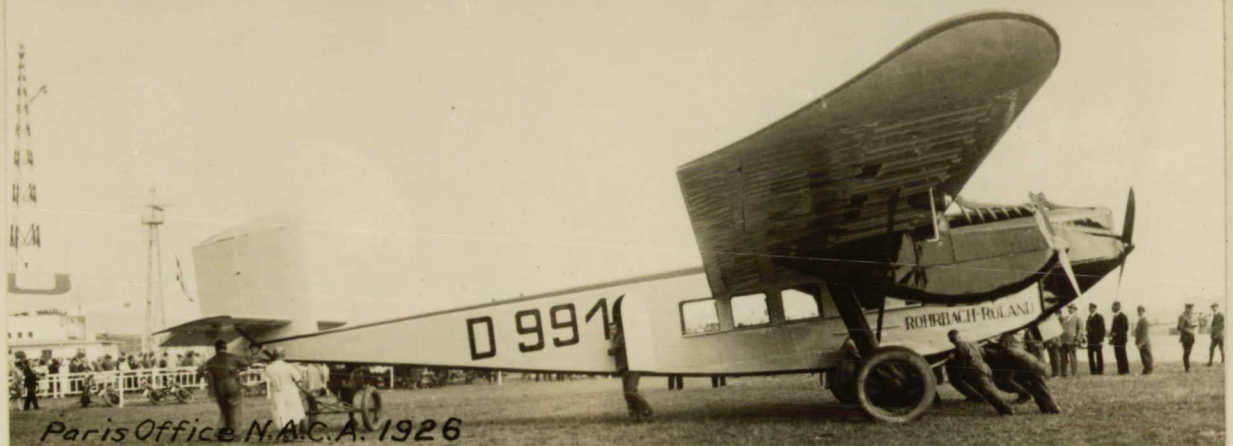


Fig.1 The Rohrbach VIII "Roland" commercial monoplane.



Figs.2,3 & 4 Rhorbach - Roland Ro VIII commercial airplane with three 230 HP. B.M.W. engines.